

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
18 March 2004 (18.03.2004)

PCT

(10) International Publication Number
WO 2004/022590 A3

(51) International Patent Classification⁷: **C07K 14/47**,
A61K 38/17, C12N 5/06

(21) International Application Number:
PCT/EP2003/009882

(22) International Filing Date:
5 September 2003 (05.09.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
102 41 207.3 5 September 2002 (05.09.2002) DE
103 05 607.6 11 February 2003 (11.02.2003) DE

(71) Applicant (*for all designated States except US*): **CELL
CENTER COLOGNE GMBH** [DE/DE]; Joseph-Stelz-
mann-Str. 50, 50931 Köln (DE).

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): **HANISCH, Franz-
Georg** [DE/DE]; Graf-Gessler-Strasse 6, 50679 Köln (DE).

(74) Agent: **STEINECKE, Peter**; **MÜLLER FOTTNER**
STEINECKE, P.O. Box 31 01 40, 80102 München (DE).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,
SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report*
- *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments*

(88) Date of publication of the international search report:
20 January 2005

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: IMMUNOGENIC MUC1 GLYCOPEPTIDES

(57) Abstract: Provided are novel MUC1 peptides for use in anti-tumor vaccination and methods of producing those peptides. Furthermore, methods of producing a population of autologous antigen presenting cells (APCs) and of producing genetically engineered APCs, which are capable of inducing effective immune responses against MUC1 are described. The described peptides are particularly useful for the treatment of breast cancer or other MUC1-positive carcinomas including colorectal, pancreatic and gastric carcinomas.

WO 2004/022590 A3

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07K14/47 A61K38/17

C12N5/06

REC'D. EPIC

90/525672
24 FEB 2005

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07K A61K C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, WPI Data, PAJ, Sequence Search, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/57068 A (APOSTOLOPOULOUS VASSO ; AUSTIN RES INST (AU); MCKENZIE IAN F C (AU); P) 9 August 2001 (2001-08-09) SEQ IND NO:16 page 7, line 20 page 8, line 1 page 10, lines 19-22	1-7, 12, 13, 18-24
X	WO 98/50527 A (LONGENECKER B MICHAEL ; BIOMIRA INC (CA); KRANTZ MARK J (CA); AGRAWAL) 12 November 1998 (1998-11-12) page 43; table 3 page 14, lines 19-24	1-7, 12, 13, 18-22, 24



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

23 August 2004

Date of mailing of the international search report

30. 11. 04

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Herrmann, K

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>PIETERSZ G A ET AL: "Definition of MHC-restricted CTL epitopes from non-variable number of tandem repeat sequence of MUC1" VACCINE, BUTTERWORTH SCIENTIFIC. GUILDFORD, GB, vol. 18, no. 19, April 2000 (2000-04), pages 2059-2071, XP004202504 ISSN: 0264-410X table 4</p>	1-7,12, 13
X	<p>APOSTOLOPOULOS V ET AL: "MUC1 PEPTIDE EPITOPES ASSOCIATED WITH FIVE DIFFERENT H-2 CLAS I MOLECULES" EUROPEAN JOURNAL OF IMMUNOLOGY, WEINHEIM, DE, vol. 27, 1997, pages 2579-2587, XP001009768 ISSN: 0014-2980 page 2580, paragraph 2.7; table 1</p>	1-7,12, 13
A	<p>GELDHOF P ET AL: "Proteinases released in vitro by the parasitic stages of the bovine abomasal nematode Ostertagia ostertagi" PARASITOLOGY, vol. 121, no. 6, December 2000 (2000-12), pages 639-647, XP009035151 ISSN: 0031-1820 the whole document</p>	8-11
T	<p>HANISCH FRANZ-GEORG ET AL: "O-linked glycans control glycoprotein processing by antigen-presenting cells: A biochemical approach to the molecular aspects of MUC1 processing by dendritic cells." EUROPEAN JOURNAL OF IMMUNOLOGY, vol. 33, no. 12, December 2003 (2003-12), pages 3242-3254, XP009035167 ISSN: 0014-2980 the whole document</p>	1-24

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP 03/09882

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
see FURTHER INFORMATION sheet PCT/ISA/210
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

invention 1: claims 1-24 (all partially)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.1

Although claim 24 is directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

Claim 14 includes an in vivo step ("providing autologous APCs from a tumor patient") and is therefore not allowable in certain member states (cf. e.g. Art. 52(4) of the EPC).

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

/EP 03/09882

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0157068	A	09-08-2001	US 6548643 B1	15-04-2003
			WO 0157068 A1	09-08-2001
			AU 2987701 A	14-08-2001
			CA 2399026 A1	09-08-2001
			EP 1257565 A1	20-11-2002
			JP 2003533181 T	11-11-2003
WO 9850527	A	12-11-1998	AU 727863 B2	04-01-2001
			AU 7371298 A	27-11-1998
			CA 2289742 A1	12-11-1998
			EP 0986636 A1	22-03-2000
			JP 2001525668 T	11-12-2001
			WO 9850527 A1	12-11-1998
			US 6600012 B1	29-07-2003